Terahertz photonic crystals fabricated by a high power femtosecond laser ablation technique

S. C. Choi, C.-S. Kee, Y. C. Noh, D.-K. Ko*, and J. Lee
Advanced Photonics Research Institute, Gwangju Institute of Science and Technology, Gwangju 500-712, Republic of Korea

Recent advances in generation and detection of terahertz (THz) waves are opening new technologies for Imaging, chemical detection, explosive Inspection, and so on [1]. The properties of photonic crystal such as photonic band gap can give an opportunity to improve the performance of THz sources and defectors. Furthermore, THz waveguides, filters and cavities based on photonic crystals could become important components for developing THz on-chip photonics. In this presentation, we show that micro optical machining using a high power femtosecond laser ablation technique can be suitable in the fabrication of THz planar photonic crystals. This technique requires simple processes and low-cost in comparison with a deep reactive ion etching technique that has been usually employed in micromachining of THz photonic crystals [2]. A square array of holes in a glass fabricated by the micro optical machining technique was shown Fig. 1. The period and hole size are easily controlled by varying position of microstage, laser spot size and power. The transmission spectra measured by scan fourier transform spectrometer equipped with a Si bolometer detector will be presented.

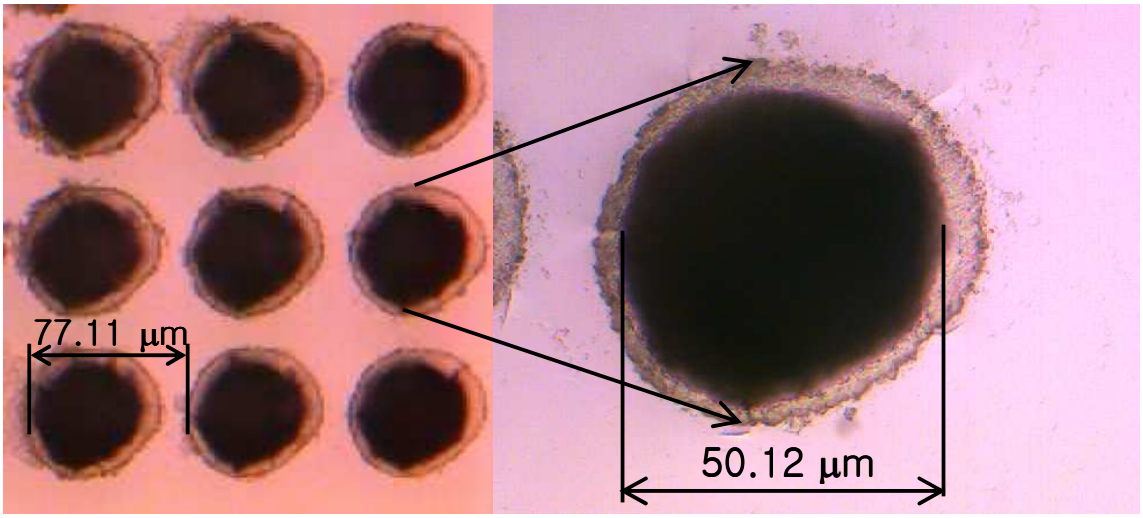

Figure 1. Microscope picture of square array of holes in a glass with thickness of 0.7 mm fabricated by a high power femtosecond laser ablation technique. The period of array is about 77 μm and the hole diameter about 50 μm.

Reference

*Email: dkko@gist.ac.kr

[1] X.-C. Zhang, *SPIE Lecture short course*, (2004).
[2] N. Jukam and M. S. Sherwin, *Applied Physics Letters*, **83**, 21 (2003)